

MARITIME

SHOPERA:

Task 1.1: Environmental Conditions

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Environmental Conditions for Assessment of Sufficient Manoeuvrability

- Sources:
 - MEPC 65/4/3, Annex 1 (2013), *Minimum Power Guideline*
 - Environmental conditions during groundings and collisions: statistics from SOLAS, HARDER, GOALDS
 - Accident investigations
 - ANEP-79 (2007) *Controllability and Safety in a Seaway*, NATO
 - Interviews with ship masters

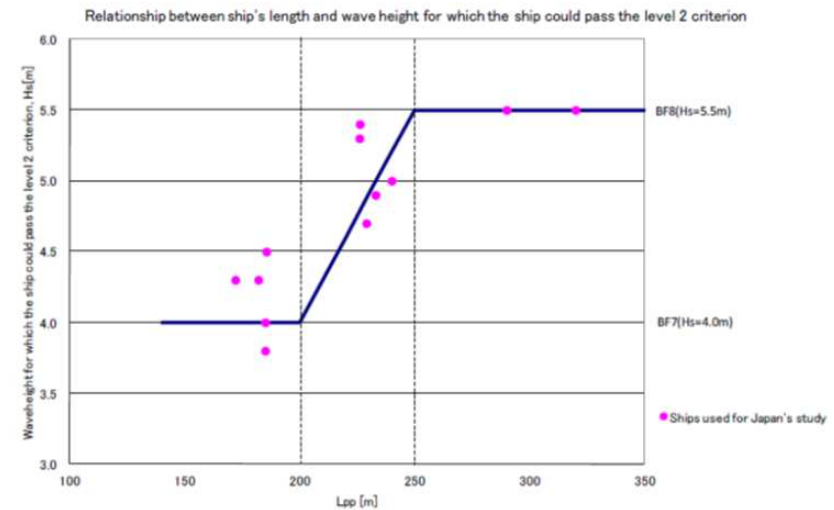
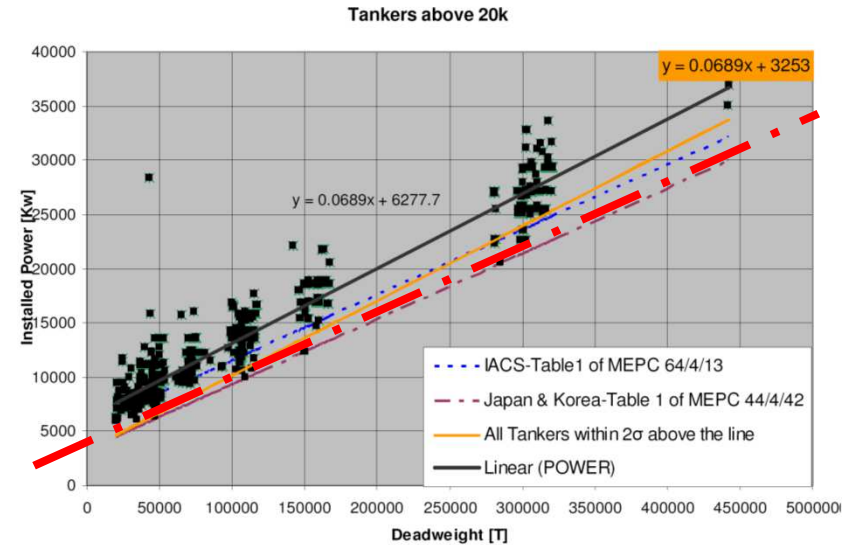


Environmental Conditions:

MEPC 65/4/3, Annex 1 (2013), Minimum Power Guideline

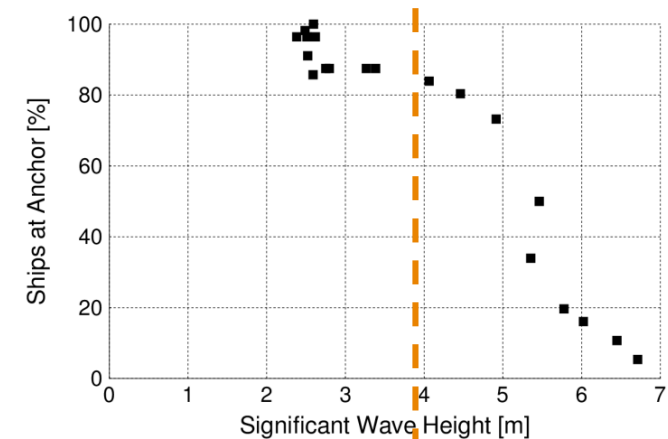
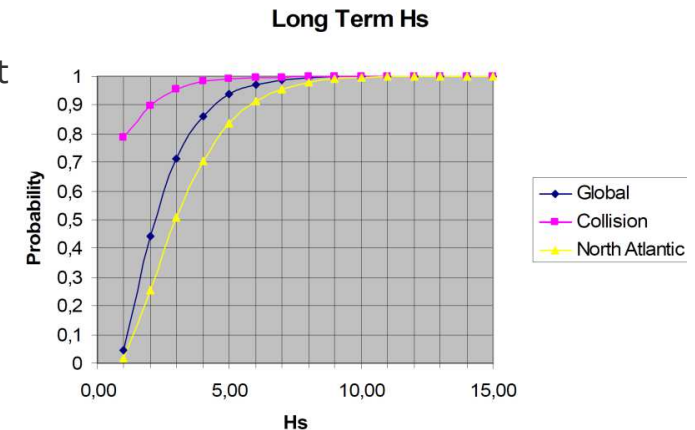
L_{pp} [m]	h_s [m]	T_p [s]	V_{Wind} [m/s]
<200	4.0	7.0 bis 15.0	15.7
>250	5.5	7.0 bis 15.0	19.0

- Reduction up to $h_s=4.0$ m follows from the application of advance speed and course-keeping criteria (background of the *Minimum Power Guideline*) to small tankers and bulk carriers (DWT \approx 20000 t)
- under assumption that all „EEDI Database“ ships are sufficiently manoeuvrable in adverse conditions



Environmental Conditions: Accident Statistics etc.

- Background of SOLAS:
 - HARDER: collisions happen mostly in calm water, and very rare at $h_s > 4.0$ m
 - Groundings were not taken into account – note however that adverse weather conditions are more relevant to groundings than to collisions
 - Therefore, further databases should be evaluated (GOALDS?)
- Accident investigation: grounding in heavy weather of bulk carrier *Pasha Bulker*:
 - Figure: number of ships at anchor vs. h_s : 80% of ships at $h_s=4.5$ m and 20% of ships at $h_s=6.0$ m
- Accident investigation reports of MAIB (Marine Accidents Investigation Branch): in work
- Interviews with ship masters (container ships and bulk carriers): in work
- ANEP-79 (2007) Controllability and Safety in a Seaway:
 - Operability for most operations: Bft6, $h_s=4.0$ to 6.0 m
 - Rescue and patrol: no weather limitations



Environmental Conditions: Summary

- MEPC 65/4/3, Annex 1 (2013), *Minimum Power Guideline*: $h_s=4.0$ to 5.5 m
- SOLAS (HARDER): $h_s < 4.0$ m
- Grounding of bulk carrier *Pasha Bulker*: $h_s=6.0$ m
- ANEP-79 (2007) Controllability and Safety in a Seaway: $h_s=4.0$ to 6.0 m (operability) up to maximum wave heights (rescue and patrol)
- Ongoing work:
 - Accident investigation reports by MAIB (Marine Accidents Investigation Branch)
 - Interviews with ship masters (container ships and bulk carriers)

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